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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

By: Federal Express
Ms. Donna R. Searcy
Federal Communications Commission
1919 M. Street, N.W. - Room 222
Washington, D.C. 20554

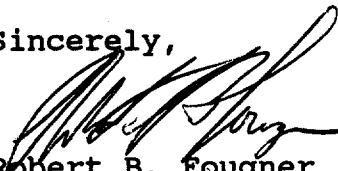
RE: Comments of CYLINK Corporation in RM No. 8013

Dear Madam Secretary:

Transmitted herewith are an original and nine copies of
Cylink's Comments in the referenced proceeding.

If you have any questions with regard to this matter,
please do not hesitate to contact me.

Sincerely,


Robert B. Fougner
General Counsel

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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

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FEB - 8 1993

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

FCC MAIL ROOM

In the Matter of)

)
Amendment of Section 90.239 of the)
Commission's Rules to Adopt Permanent)
Regulations for Automatic Vehicle)
Monitoring Systems)

RM No. 8013

MOTION TO ACCEPT LATE FILLED COMMENTS OF CYLINK CORPORATION

Cylink Corporation ("Cylink"), pursuant to Section 1.46 of the Commission's Rules, respectfully requests that its attached Comments in the above-captioned matter be made a part of the record.

Cylink requests leave to file its Comments at this time because its interest in this proceeding has only recently come to light. On or about December 29, 1992, PacTel Teletrac ("Teletrac") notified one of Cylink's customer's of a potential conflict between Cylink's certified Part 15 device and Teletrac's AVM system. A copy of Teletrac's notice is annexed to this motion as Exhibit "A". This conflict posed by Teletrac is not unique to Cylink's equipment nor is it localized to the specific site challenged by Teletrac.

Because of the potential impact on Cylink's products and the "chilling" effect this rulemaking could have on all companies operating under Part 15 rules, a complete record in this proceeding is essential.

For these reasons, Cylink asks that the Commission grant this motion for late filing of its Comments.

Respectfully Submitted
CYLINK CORPORATION

By 

Robert B. Fougner
General Counsel

Chicago Operations
1725 Winnetka Circle
Rolling Meadows, Illinois 60008-1373
(708) 253-9900
FAX (708) 253-1891

ATTN: Steve Schorn

PAC TEL
TELETRAC

A Pacific Telesis Company

December 29, 1992

Mr. George Martin
Sherwin - Williams Co.
11542 S. Champlain Ave.
Chicago, IL 60628

Post-It™ brand fax transmittal memo 7671		# of pages >	
To	Victor Frank	From	George Martin
Co.	Cylink	Co.	Sherwin Williams
Dept.		Phone	312/831-3174
Fax	708/377-3422	Fax	

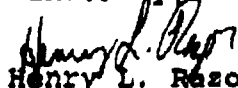
Dear Mr. Martin:

This letter is in regards to the wireless ethernet network that I recently spoke to you about.

PacTel Teletrac operates a vehicle location system in the greater Chicago area that utilizes the frequency spectrum ranging from 904MHZ to 912MHZ. This spectrum was assigned to us by the Federal Communications Commission (FCC). I recently noticed a signal causing harmful interference to our system and tracked this interference to your plant that is located in the 115th and Cottage Grove Ave. area. This signal is adversely affecting our system and should be removed from the 904Mhz-912MHZ frequency spectrum immediately. I'm enclosing a copy of the FCC rules that are pertinent to this situation and a copy of the frequency allocation chart for the 904MHZ to 912MHZ spectrum.

Your cooperation and assistance in this matter is greatly appreciated.

Sincerely,



Henry L. Razor (Network Field Engineer)

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

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FEB 8 1993
RM No. 8013
FCC MAIL ROOM

**COMMENTS SUBMITTED BY CYLINK CORPORATION IN OPPOSITION
TO PETITION OF TELETRAC**

Cylink Corporation ("Cylink"), submits these Comments in opposition to the Petition For Rulemaking filed by North America Teletrac And Location Technologies, Inc. (collectively "Teletrac") for permanent rules governing the licensing and use of AVM technology in the 902-928 MHz spectrum. It is now apparent that Teletrac's Petition raises serious conflict with the burgeoning use of this spectrum under Part 15 of the Commission's rules. Accordingly, Cylink urges the Commission to defer action until after a Notice of Inquiry and a thorough investigation of the merits.

INTRODUCTION

As evidenced by Teletrac's demand letter dated December 29, 1992, to Cylink's customer (Exhibit "A"), Teletrac's system can not easily tolerate spread spectrum devices operating under Part 15 in the 902-928 MHz band. Teletrac's solution is to unilaterally demand removal of such devices from operation. Such demands threaten to frustrate Cylink's investment in innovative technology, fail to cope with the imminent proliferation of

millions of similar devices, and are detrimental to the Commission's policies implemented under Part 15.

**CYLINK'S EXTENSIVE DEVELOPMENT
OF SPREAD SPECTRUM EQUIPMENT FOR USE UNDER PART 15**

In 1986 Cylink started an R&D effort to develop commercial spread spectrum radio products conforming to the 1985 FCC Part 15 rule which allows unlicensed use of these radios for up to one watt output power. This effort resulted in a range of commercial radio products operating in all three ISM bands, including 902-928 MHz. At this time over 1,000 such radios are being used in actual applications by Cylink's customers.

In addition to the development of spread spectrum radios for its own markets, Cylink is actively involved in several joint ventures to develop cordless telephones, wireless PBXs, wireless local loops, and wireless LANs for the ISM bands. Cylink is the first to have developed a single chip implementation of a spread spectrum baseband digital modem, designed for a cordless telephone. This single chip implements a spread spectrum transceiver, consisting of only 15,000 gates, including:

- o Direct sequence spread spectrum transmitter
- o Spread spectrum receiver with:
 - 16 chip matched filter correlators
 - Chip time acquisition and tracking
 - Detection

- o Time Division Duplexing (TDD) circuits
- o Packet framing with data and overhead bits
- o Multiplexer/demultiplexer with FIFOs

Over a six year period starting in 1987, Cylink has gone through the following sequence of development stages to get to this final integrated spread spectrum modem chip for cordless telephone applications:

- o In 1987 Cylink completed a breadboard of the spread spectrum digital modem consisting of a single 9" x 13" board with approximately 300 discrete components.
- o In 1989 prototype spread spectrum radios were developed using three newly designed gate array chips with the following functions:
 - A direct sequence spread spectrum transmitter
 - A set of matched filter correlators
 - Chip time acquisition and tracking with a detector
- o In 1991 these three gate array chips were reduced to two chips, a spread spectrum transmitter chip and a spread spectrum receiver chip. This together with separate TDD circuits in the form of a programmable Xilinx gate array chip resulted in the basic digital transceiver section that was used in the Cylink spread spectrum radios sold into the commercial market today.
- o In 1992 a joint venture project resulted in the fully integrated spread spectrum baseband transceiver chip describe above. This chip is designed for a new FCC

certified digital spread spectrum 900 MHz cordless telephone that is now available in the market.

- o The digital cordless telephone chip is approximately 80% of the required logic for the high capacity S-CDMA digital transceiver section that Cylink has proposed for PCS applications. Cylink is currently designing this new single chip implementation for high capacity PCS applications and will develop these new handsets and a base station in 1993.

**TELETRAC'S PETITION POSES SEVERE CONFLICT
WITH THE COMMERCIAL APPLICATION OF
SPREAD SPECTRUM TECHNOLOGY OPERATING UNDER PART 15**

As previously noted, a completed 900 MHz digital spread spectrum cordless telephone using Cylink designed RF and digital chips has received FCC certification and is now being sold in the consumer electronic market. One such digital cordless telephone for the 902-928 MHz ISM band, manufactured by Cincinnati Microwave Incorporated, has received FCC certification and is now the first spread spectrum cordless telephone being sold throughout the United States.

The existing and potential market in the United States for Part 15 cordless telephones alone is significant. According to marketing studies by Cylink's joint venture partners, the volume for cordless telephones in the United States is currently in excess of 15 million units per year and, by 1995, is expected to reach or exceed 25 million units per year. One of the driving

reasons for the robust expansion of this market is the availability of the 900 MHz band under Part 15 with commensurate improvements in voice quality and range. The utility of this equipment to the American commercial and consumer markets can not be overlooked.

Unfortunately, Teletrac's system appears very prone to interference from any type of radio frequency in the 904 to 912 MHz range. Synchronized narrow band 925 MHz transmitters are used to address each vehicle which reply with a uniquely coded spread spectrum 904 to 912 MHz signal. The vehicle's signal is detected at multiple receiver sites which determine the vehicle's location by triangulation and signal timing.

The capital cost of Teletrac's architecture is determined largely by the number of receiver sites in its system. In order to minimize the number of sites, Teletrac has implemented a highly sensitive receiver design that is affected by any radio signals in the band 904 to 912 MHz. The receiver's automatic gain circuit will detect any signal and decrease its sensitivity so that strong signals do not distort the information, and weak signals will be amplified. The receiver design is such that any radio signal, whether spread spectrum or not, will be captured.

In light of today's technology, Teletrac's requirement for 8 MHz of spectrum is both excessive and inefficient. By comparison, Qualcomm Corporation has demonstrated a spread

spectrum system for cellular that supports 10 times the number of users per cell site than the present analog system in less bandwidth than Teletrac's system. Furthermore, Teletrac's implementation defeats one of the cardinal technical advantages of spread spectrum - its relative immunity to interference or "jamming". For this very reason military communication systems also have utilized spread spectrum technology because of its inherent difficulty to detect or "jam" with interference. Properly designed, a spread spectrum system should coexist with both conventional narrow band and other spread spectrum signals.

Faced with the prospect of millions of cordless telephones, as well as other devices, operating in the 902-928 MHz band, Teletrac's system will soon be overwhelmed by activity it treats as interference. How, then, will this conflict be fairly regulated? The Commission must ask whether it can fairly address Teletrac's Petition at this time in a vacuum, without regard to the significant interests of other parties operating in this spectrum under Part 15.

**THE COMMISSION SHOULD FIRST EXPLORE ALTERNATIVE
REGIMES FOR UTILIZATION OF THIS SPECTRUM**

The current Rules do not squarely address the conflict posed by Teletrac's system, nor does Teletrac's Petition raise the issue of resolving interference with Part 15 equipment. Teletrac boldly reads its preference under Part 90 to authorize unilateral demands for removal of any interference by operators under Part 15. Obviously, in light of Teletrac's actions, the

existing regime does not promote cooperative utilization of this spectrum.

Particularly troubling is that the interference complained by Teletrac is a problem of its own making. Teletrac appears to have designed the sensitivity of its receiver sites with the objective of minimizing the number of locations. In doing so, Teletrac also increased the likelihood of interference from nominal use of this spectrum by other devices. Having imposed a highly sensitive architecture, Teletrac now seeks to drive numerous other users out of this spectrum.

Cylink requests that the Commission reevaluate the preference granted AVMs such as Teletrac under Part 90 in light of the technological developments emerging under Part 15. Cylink submits that the Commission's objective should be to promote cooperation in alleviating potential interference, rather than encouraging controversy. Instead of granting Teletrac's Petition, the Commission should consider modifying the status of AVM operators to specifically accommodate Part 15 equipment.

CONCLUSION

The Commission should not proceed further in this matter without the benefit of a fully developed record. The impact of technological developments by Cylink and others directed at the Part 15 market are just beginning to emerge. They need to be understood before the Commission takes any action which may effectively foreclose their continued contribution to

significant consumer and industrial interests.

In order to allow itself this opportunity, the Commission should first issue a Notice Of Inquiry directed at all parties having an interest in operating in the 902-928 MHz spectrum under Part 15.

Respectfully Submitted,

CYLINK CORPORATION

By 

Robert B. Fougner
General Counsel

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FEB 8 1993

CERTIFICATE OF SERVICE

FOO MAIL ROOM

I hereby certify that on this 5th day of February, 1993,
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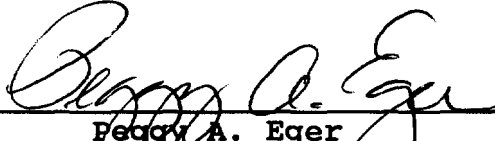
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